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# Evacuee Injuries and Demographics in Transport Airplane Precautionary Emergency Evacuations

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Final Report

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## N O T I C E

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| 16. Abstract<br>During a nine-year period from January 1, 1988, through December 31, 1996, there were more than 500 transport airplane precautionary emergency evacuations (PEEvacs), occurring on average about once a week. Each year as many as 6,000 persons participated in these events. In many cases, passenger and crewmember injuries resulted from the PEEvacs, resulting in large personal costs to passengers and crewmembers, as well as financial costs estimated to be in excess of \$11 million annually to airlines. This study was undertaken to sample available evacuee and injury data related to a subset of those PEEvacs, including information on types and causes of evacuee injuries, and evacuee age and gender. Other demographics were sought, but that information was generally unavailable. Unique, direct contacts with airport management were used to supplement publicly available information on certain of the PEEvacs, including activation of emergency escape slides during PEEvacs, injuries caused by the PEEvacs, and outcomes. Of the 136 airports identified as experiencing PEEvacs, 24 were selected to provide detailed data on injured evacuees for a 34-month interval lasting from December 1994 through November 1996. During this time frame, there were 109 precautionary evacuations at the 24 airports selected, i.e., approximately 70% of all reported evacuation events that occurred during the study period. Specific information on 193 persons injured during 19 of these evacuations was obtained and analyzed. The results of this study confirm the need for improved incident reporting and continued research into preventing injuries associated with the use of emergency egress systems and precautionary emergency evacuations of transport airplanes. The results should be additionally useful when considering proposed changes to applicable regulations and to airline training programs and aircraft emergency operations. |  |  |   |  |           |
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# EVACUEE INJURIES AND DEMOGRAPHICS IN TRANSPORT AIRPLANE PRECAUTIONARY EMERGENCY EVACUATION

## INTRODUCTION

The number and frequency of transport airplane Precautionary Emergency Evacuations (PEEvacs) have recently been described by Hynes (1999), who studied the occurrence of PEEvacs during the period from January 1988 through December 1996 (see Figure 1). These events generally resulted from instances in which crewmembers or passengers believed the probability of a fire to be high, although no fire actually developed. As in other emergency evacuations, passengers and crew often suffered injuries; had they known that no fire would result, it would have been safer for them to remain on the airplane.

More than 500 PEEvacs occurred during the period studied, i.e., about 1 evacuation every 6 days. In contrast, the incident databases maintained by the Federal Aviation Administration (FAA) and by the National Transportation Safety Board (NTSB) reveal relatively little about the occurrence of PEEvacs,

even though these evacuations usually occur on airport properties, with the airport Crash-Fire-Rescue (C-F-R) teams responding. PEEvacs are, however, typically documented in records maintained by airport managers, as identified by Hynes (1994), using airport records as the primary data source. Other sources of information regarding PEEvacs included airline records, media reports, and insurance company records.

PEEvacs result in significant personal costs to the passengers and crew members involved, not to mention the more than \$11 million they cost the airlines annually (Hynes, 1999). To a large extent, the personal costs result from injuries to passengers and crew members evacuating the airplanes during the PEEvacs, and primarily include expenses for medical treatment, lost earnings and productivity, and associated litigation. The purpose of this report is to describe injured evacuees

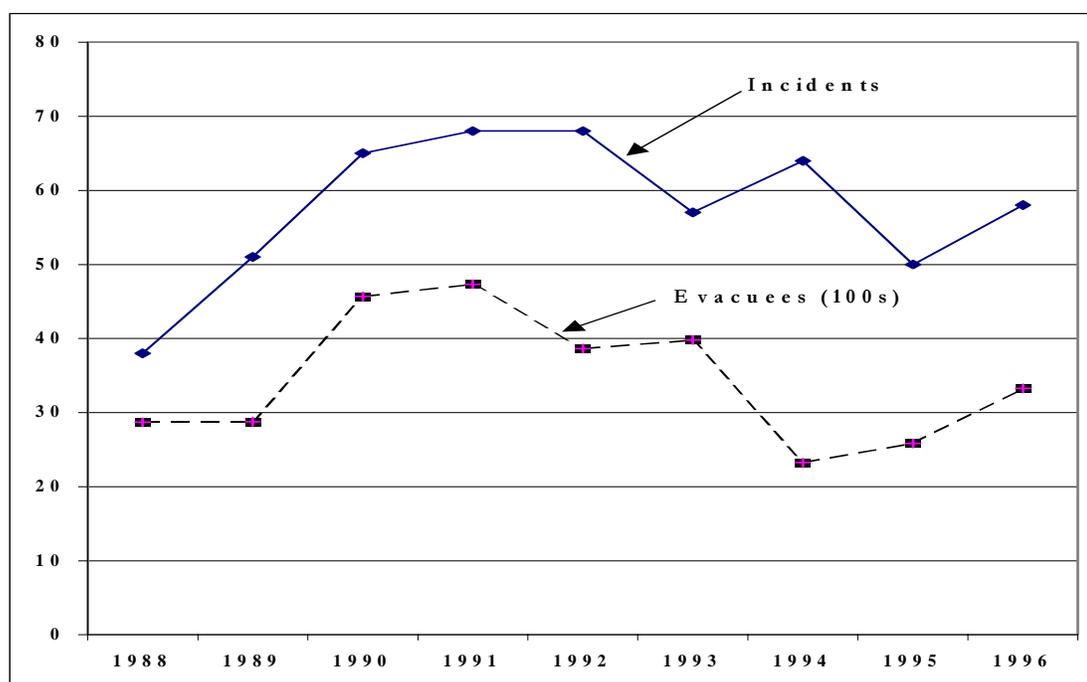


Figure 1. Number of Precautionary Evacuations and Evacuees

and, where possible, their demographics, to provide a base for improved aircraft operations related to minimizing the sequelae of these apparent emergency events.

## METHODS

For the purposes of this study, the term *precautionary emergency evacuation* includes: (a) those transport airplane incidents in which the emergency escape system was deployed, and (b) those incidents in which the emergency escape system was not deployed, but passengers and crew members were forced to conduct an unscheduled deplanement at other than a normal gate location.

Information on the use of emergency escape systems and emergency evacuations was collected from several sources, including the FAA *Accident and Incident Data System* (AIDS), the NTSB accident database, and the National Aeronautics and Space Administration (NASA) *Aviation Safety Reporting System* (ASRS). Information suggesting that precautionary evacuations might have occurred was also collected from the *FAA Administrator's Daily Bulletin*.

An historical review of this information was conducted to identify specific airports at which PEEvacs occurred and the approximate dates of those incidents. This information was used to establish a contact list for subsequent surveys, in which information was obtained from 136 airport managers. The results of these surveys have been reported by Hynes (1994, 1997, 1999). As a point of reference, those airports accounted for 85.6% of all CFR Parts 121 and 135 passenger enplanements in 1995.

Of the 136 airports originally contacted by Hynes, 24 airports (see Appendix A) were selected as sources of injury data resulting from PEEvacs that occurred during the last 34-month period of the study, extending from February 1994 through November 1996. During that time frame, the 24 airports had experienced 109 evacuation events (i.e., 70% of all evacuations that occurred), a number typical of any similar interval during the study period. Appendix B contains the airport contact letter and data format sheet, as well as an injured evacuee follow-up telephone interview, used to obtain the information. A response rate of 100% was achieved from the 24 airports; most were also visited to review the raw data and to obtain needed information when it was unavailable from other sources.

The 34-month interval was selected for convenience and cost/effectiveness, because incident data are much harder to obtain as the time after an incident increases, making data collection efforts extremely difficult. Similarly, the recall of evacuees who participate in such incidents typically declines as time elapses, making corroboration of specific details less certain.

## RESULTS

Nineteen (17.4%) of the 109 precautionary evacuations resulted in injuries to 190 passengers and 3 crewmembers. Approximately 86% of the evacuees reporting injuries required medical assistance; of those, 67% were treated at a hospital. Information related to the specific treatments and outcomes of those injured (e.g., hospitalized for x number of days, treated and released, permanently disabled) was generally not available because of privacy laws and the absence of this type of information in airport records. In some cases, telephone interviews were attempted with those who had been injured in an effort to obtain this information. For various reasons, few injured passengers were actually contacted, and those who were contacted were typically vague regarding relevant details.

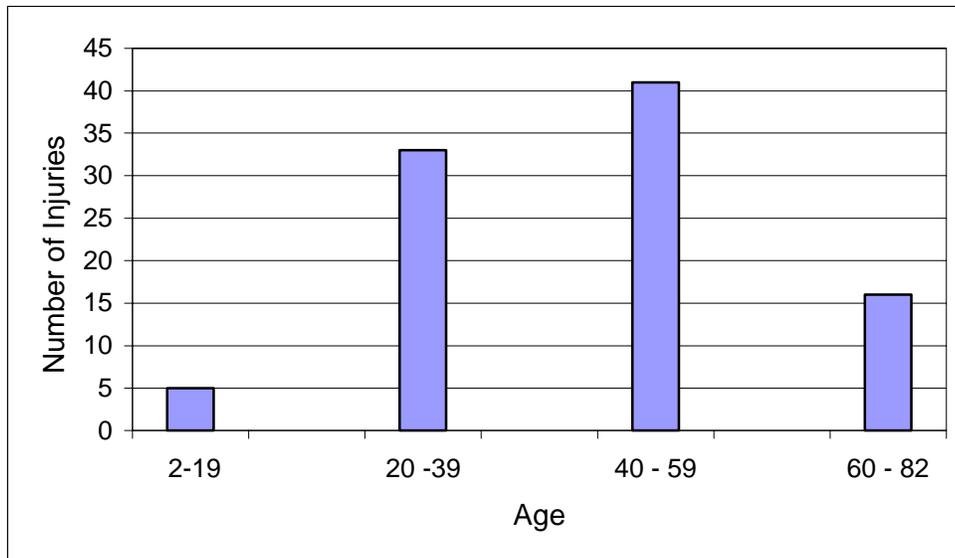
As shown in Appendix C, available information on evacuee injuries varied widely in descriptive quality. Of the 193 persons reported as injured, information was available for 135 (69.9%). However, 26 (13.5%) of these injured evacuees refused medical assistance, eliminating any detailed record of the nature of their injuries. See Table 1 for the general types of injuries reported.

Available demographic information about injured evacuees may also be found in Appendix C. Typically, age and gender were the only categories of data obtainable, and even those data were not available for all injured evacuees. Males (mean age of 42.7 years) accounted for 36.8% of the reported injuries and females (mean age of 45.1 years) comprised 52.8% of those injured; the rest (4.5%) were not identified as to gender. Sixty-three percent of the injured evacuees for whom age was available were 40 years or older, i.e., the occurrence of injuries was skewed toward older evacuees (see Figure 2). The degree to which this skewing represents a typical airliner passenger complement remains to be determined. Information on the height of injured evacuees was not available;

**Table 1.** Evacuee Injuries

| Injury                  | Number | Percentage of Total |
|-------------------------|--------|---------------------|
| Back / Neck             | 53     | 34.2                |
| Leg / Foot              | 27     | 17.4                |
| Cuts/Abrasions          | 27     | 17.4                |
| Minor                   | 19     | 12.3                |
| Broken Bones            | 11     | 7.1                 |
| Abdominal / Chest Pains | 10     | 6.5                 |
| Sprains                 | 8      | 5.2                 |

Totals exceed 135 because of specific reporting of multiple injuries.



**Figure 2.** Age Distribution of Injured Evacuees

similarly, weight was rarely included in the records. When questioned about these omissions in evacuee demographics, airport personnel indicated that such information was relatively unimportant for their needs; therefore, they made little effort to obtain it. Insurance company records were generally inaccessible, and media reports were not helpful for this aspect of the investigation.

## DISCUSSION

In addition to the emotional and physical pain of personal injuries associated with precautionary emergency evacuations, the economic costs to air travelers in lost earnings, productivity, medical costs, and related expenses appears to be very high. Using a modification of the formula in Bulletin APO-90-1, published by the FAA Office of Aviation Policy and Plans, Hynes (1999) estimated that passenger injuries cost the airlines more than \$8.5 million annually. That figure is based on an analytical scheme in which serious injuries are defined as those with losses of \$50,000 or more, substantial injuries as those with losses of \$10,000 to \$49,999, and minor injuries as those with claimed losses of less than \$10,000. When considering the comparatively large percentage of injured evacuees age 40 or older, who would recover less quickly than younger individuals in many cases, it is possible that expenses for acute and extended medical care, particularly, were greater than estimated. Further, considering that the average age of the flying population is generally increasing, such costs associated with future PEEvac would be expected to escalate accordingly.

Discussions with airline staff, insurance industry personnel, and attorneys indicated that the administrative and legal expenses to airlines associated with injury claims can also be significant, (Hynes, 1999). Together, these sources estimated that administrative costs to airlines associated with minor injuries average \$1,000 per injury claim, rising to \$2,500 for each substantial injury. Administrative costs for serious injuries averaged \$25,000, without litigation, and \$75,000 if litigation occurred. When applied to the 109 PEEvac-related injuries detailed in this study, administrative costs associated with processing injury claims would be expected to exceed \$1.97 million. Again, as the extent and duration of associated medical care increases, these costs would also rise. Together with the personal costs identified above, the impact of PEEvac on airline operations becomes more than just a nuisance.

Despite an apparent lack of public awareness, the frequency of precautionary emergency evacuations has been quite high. The development of preventive and mitigative strategies to address PEEvac is essential; however, such an endeavor requires a better understanding of the nature, causes, and results of PEEvac than is readily available. Upgraded information management systems and research dedicated to minimizing these events are needed to address this requirement, as well as to minimize the negative consequences of all emergency evacuations, whenever these events should occur. Preventing passenger and crewmember injuries associated with emergency evacuations is an important objective that can be accomplished in several ways. Included are: (1) safely reducing the number of these events, (2) improving the design of aircraft emergency egress systems and emergency exits, (3) upgrading air carrier training programs and operations, and (4) improving passenger safety information and education. Additional research directed toward further evaluating the important safety and economic issues associated with emergency evacuation events should also be undertaken.

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## APPENDIX A

### Airports Surveyed

| ID                           | CITY, STATE               | 1994 | 1995 | 1996 | 1998 | Rank <sup>‡</sup> | Enplanements <sup>‡</sup> |
|------------------------------|---------------------------|------|------|------|------|-------------------|---------------------------|
| ATL                          | ATLANTA,GA                | X    | X    | X    | X    | 2                 | 28,090,978                |
| BNA                          | NASHVILLE, TN             | X    | X    | X    | X    | 42                | 3,685,219                 |
| BOS                          | BOSTON, MA                | X    | X    | X    | X    | 15                | 11,734,693                |
| CLE                          | CLEVELAND, OH             |      | X    | X    | X    | 32                | 5,270,004                 |
| CLT                          | CHARLOTTE, NC             | X    |      | X    | X    | 20                | 10,463,122                |
| CVG                          | GREATER CINCINNATI, KY    | X    | X    | X    | X    | 25                | 7,504,549                 |
| DAY                          | DAYTON, OH                |      |      | X    | X    | 80                | 1,088,823                 |
| DEN                          | DENVER, CO                | X    | X    | X    | X    | 7                 | 14,858,763                |
| DFW                          | DALLAS-FT WORTH, TX       | X    | X    | X    | X    | 3                 | 26,962,940                |
| DTW                          | DETROIT, MI (Metro)       | X    | X    | X    | X    | 9                 | 14,082,598                |
| FLL                          | FT LAUDERDALE, FL         | X    | X    | X    | X    | 34                | 4,787,467                 |
| IAH                          | HOUSTON, TX               | X    | X    | X    | X    | 16                | 11,350,898                |
| JFK                          | NEW YORK, NY (Kennedy)    | X    | X    | X    | X    | 8                 | 14,601,827                |
| LGA                          | NEW YORK, NY (La Guardia) | X    | X    | X    | X    | 21                | 10,297,628                |
| MCO                          | ORLANDO, FL               | X    | X    | X    | X    | 19                | 10,583,166                |
| MSP                          | MINNEAPOLIS, MN           | X    | X    | X    | X    | 14                | 12,559,491                |
| ONT                          | ONTARIO, CA               |      |      | X    | X    | 46                | 3,232,996                 |
| ORD                          | CHICAGO, IL (O'Hare)      | X    | X    | X    | X    | 1                 | 31,433,002                |
| PHL                          | PHILADELPHIA, PA          | X    | X    | X    | X    | 23                | 8,791,372                 |
| SAV                          | SAVANNAH, GA              |      |      |      | X    | 98                | 565,230                   |
| SFO                          | SAN FRANCISCO, CA         | X    | X    | X    | X    | 5                 | 17,187,766                |
| SLC                          | SALT LAKE CITY, UT        | X    | X    | X    | X    | 24                | 8,741,761                 |
| STL                          | ST LOUIS, MO              | X    | X    | X    | X    | 13                | 12,790,701                |
| TPA                          | TAMPA, FL                 | X    | X    | X    | X    | 30                | 5,567,950                 |
| Number of Airports Contacted |                           |      |      |      |      | 24*               |                           |

\* 70% of the reported emergency evacuation events in the US during the 34-month period analyzed occurred at these airports.

‡ Data based on the 1995 Hynes airport survey.



## APPENDIX B

### Airport Contact Letter

Re: "Part 121 and 135 EMERGENCY EVACUATION STUDY"

Dear \_\_\_\_\_ :

In past years, your airport was one of several airports that were contacted and responded for the study of EMERGENCY EVACUATION EVENTS by Part 121 and 135 Air Carriers. To update these past studies, the Federal Aviation Administration (FAA) is now conducting new research into these types of events. The goal of this research is to reduce both the number of events and the possibility of passenger and crew injuries when these events must take place.

For past studies, seventy airports were contacted. These airports included the top 40 in the US, plus airports known to have had an emergency evacuation event. The response rate was 92.8%. This was a strong indication of the value airport management placed on the study and the professional attitude of managers in supporting safety orientated research.

*Under FAA contract No. 95P53815, we have been tasked to up-date the previous data you furnished on Part 121 and 135 EMERGENCY EVACUATION EVENTS **conducted at your airport**. Please review your records for the events listed and send us the requested information. To save time and expense, copies of any "Incident Reports" or any other type of existing records that contain the same information is acceptable.*

For the current study, only a few airports are being asked to provide a small amount of additional data. Attached is a form which identifies by date emergency evacuation events which took place at your airport. We want to keep any inconvenience or cost to you in responding to this FAA study to a minimum.

We are also sending you a copy of an analysis of the previous study and hope that some of the findings will be of interest to you. If you have any questions, please give us a call at our toll free number 1-888-335-5754. Thanks in advance for your cooperation.

Regards and have a good day.

DR. MICHAEL K. HYNES  
Director of Aviation Research  
WESTERN OKLAHOMA STATE COLLEGE  
November 12, 1997

(Our toll free number is 888-335-5754)



**Injured Evacuee Telephone Interview Format**

Hello My name is \_\_\_\_\_ and I am calling you from Oklahoma.

I work with Hynes and Associates, Inc. an Oklahoma aviation research company.

We are working on a contract for the Federal Aviation Administration, the FAA.

You were listed as one of the people who were on a \_\_\_\_\_ Airlines flight back in 19\_\_  
that had a problem at the \_\_\_\_\_ airport.

|                                       |     |    |
|---------------------------------------|-----|----|
| 1. Am I speaking to the right person? | YES | NO |
|---------------------------------------|-----|----|

(If yes, continue...if no---attempt to locate the correct person and continue.)

I have been asked to contact you to see how you are doing and to talk to you about the event and any injuries you may have incurred.

If you don't have a few minutes to talk to me now, when would it be a good time for me to call you again?

|  |  |    |           |     |      |       |        |
|--|--|----|-----------|-----|------|-------|--------|
| 2. Do you remember the event?  | YES  | NO |           |     |      |       |        |
| 3. a. Do you remember what your injuries were?<br>b. Can you tell me what your injuries were?  | YES  | NO |           |     |      |       |        |
| 4. a. Do you remember what caused your injuries?<br>b. Can you tell me what caused your injuries or how you were injured?  | YES  | NO |           |     |      |       |        |
| 5. Did you have to go to a hospital?   | YES  | NO | How long? |     |      |       |        |
| 6.a. Were you disabled as a result of your injuries?<br>b. Did you stay home from work?<br>c. How long were you disabled?  | YES  | NO | YES       | NO  | DAYS | WEEKS | MONTHS |
| 7.a. How are you feeling now?  |  |    |           |     |      |       |        |
| 8.a. Did you receive any financial help from the airline?<br>b. Do you feel that it was fair?<br>c. Did you need to use an Attorney?<br>d. What type (amount) of help did you receive? | YES  | NO | YES       | NO  | YES  | NO    |        |
| 9. We show that you were _____ years old back then?  | Is that correct? YES NO (Correct age was _____ ) |    |           |     |      |       |        |
| 10. About how tall are you?  |  |    | ft.       | in. |      |       |        |
| 11. Do you remember what your weight was back then?  |  |    | lb.       |     |      |       |        |



## APPENDIX C

### Specific Data On Precautionary Evacuation Injuries

| Ref # | Gender | Age | A/C  | Slides | Injury description and cause      | Hosp    |
|-------|--------|-----|------|--------|-----------------------------------|---------|
| 001   |        |     | B737 | Yes    | Broken ankle                      | Yes     |
| 002   |        |     | B737 | Yes    | Broken leg                        | Yes     |
| 003   |        |     | B737 | Yes    | Chest pain                        | ?       |
| 004   |        |     | B737 | Yes    | Minor injuries                    | ?       |
| 005   |        |     | B737 | Yes    | Minor injuries                    | ?       |
| 006   |        |     | B737 | Yes    | Minor injuries                    | ?       |
| 007   |        |     | B737 | Yes    | Minor injuries                    | ?       |
| 008   | F      | 30  | B757 | Yes    | Pain lower back-CREW              | Yes     |
| 009   | F      | 49  | B757 | Yes    | Pain neck, shoulders-CREW         | Yes     |
| 010   | F      | 40  | B757 | Yes    | Pain lower back-Minor             | Yes     |
| 011   | M      | 40  | B757 | Yes    | Abdominal pain                    | No      |
| 012   | F      | 33  | B757 | Yes    | Pain back & ankle                 | No      |
| 013   | F      | 51  | B757 | Yes    | Twisted ankle-Minor               | Yes     |
| 014   | F      | 71  | DC9  | Yes    | Right arm abrasion, left arm pain | No      |
| 015   | F      | 62  | DC9  | Yes    | Sprained left ankle               | Yes     |
| 016   | F      | 77  | DC9  | Yes    | Nervous                           | No      |
| 017   | F      | 20  | B727 | Yes    | Cut to left hand-CREW             | No      |
| 018   | F      | 39  | B727 | Yes    | Right leg & foot pain             | No      |
| 019   | F      | 27  | AT72 | N/A    | Pain left thigh & ankle           | Yes     |
| 020   | M      | 45  | AT72 | N/A    | Pain left ankle                   | No      |
| 021   | F      | 45  | B757 | ?      | Possible fracture left ankle      | Yes     |
| 022   | M      | 49  | B757 | ?      | Stiff neck & shoulder             | No      |
| 023   | M      | 36  | B757 | ?      | Pain lower back                   | No      |
| 024   | F      | 72  | B757 | ?      | Spine pain                        | No      |
| 025   | F      | 79  | B757 | ?      | Sore right wrist                  | No      |
| 026   | F      | 41  | B757 | ?      | Sore neck & upper back            | No      |
| 027   | M      | 17  | B757 | ?      | Sore jaw                          | No      |
| 028   | F      | 67  | B757 | ?      | Abrasion right patella            | No      |
| 029   | F      | 49  | B757 | ?      | Neck & clavicle pain              | No      |
| 030   | F      | 53  | B757 | ?      | Stiff lower back                  | No      |
| 031   | F      | 43  | B757 | ?      | Shortness of breath               | No      |
| 032   | F      | 50  | B757 | ?      | Pain right ankle                  | No      |
| 033   | F      | 53  | B757 | ?      | Sore lower back                   | No      |
| 034   | F      | 50  | MD11 | Yes    | Broken right ankle                | Yes     |
| 035   | F      | 58  | MD11 | Yes    | Possible back & shoulder injury   | Yes     |
| 036   | M      |     | MD11 | Yes    | Friction burns on arm             | RMA* No |
| 037   | M      | 59  | MD11 | Yes    | Slightly injured                  | RMA* No |
| 038   | F      | 45  | MD11 | Yes    | Unknown                           | RMA* No |
| 039   | F      |     | MD11 | Yes    | Pain lower right arm              | RMA* No |
| 040   | M      |     | MD11 | Yes    | Pain neck, shoulder couldn't move | Yes     |
| 041   | F      | 02  | MD11 | Yes    | Unknown                           | RMA* No |

| Ref # | Gender | Age | A/C  | Slides | Injury description and cause      | Hosp |
|-------|--------|-----|------|--------|-----------------------------------|------|
| 042   | F      | 50  | MD11 | Yes    | Complained back & neck RMA*       | No   |
| 043   | F      |     | MD11 | Yes    | Right arm RMA*                    | No   |
| 044   | F      | 76  | MD11 | Yes    | Left leg & knee                   | Yes  |
| 045   | F      | 33  | MD11 | Yes    | Lower back                        | No   |
| 046   | F      | 59  | MD11 | Yes    | Head & neck injuries RMA*         | No   |
| 047   | M      |     | MD11 | Yes    | Leg & back injuries               | Yes  |
| 048   | M      |     | MD11 | Yes    | Possible back injury              | Yes  |
| 049   | M      |     | MD11 | Yes    | Not reported                      | Yes  |
| 050   | F      | 80  | MD11 | Yes    | Not reported                      | Yes  |
| 051   | F      |     | MD11 | Yes    | Not reported                      | Yes  |
| 052   | F      |     | MD11 | Yes    | Not reported                      | Yes  |
| 053   | M      |     | MD11 | Yes    | Possible back injury              | Yes  |
| 054   | F      |     | MD11 | Yes    | Not reported                      | Yes  |
| 055   | F      |     | MD11 | Yes    | Possible leg & back injury        | Yes  |
| 056   | M      |     | MD11 | Yes    | Possible leg & back injury        | Yes  |
| 057   | F      |     | MD11 | Yes    | Not reported                      | Yes  |
| 058   | M      |     | MD11 | Yes    | Not reported                      | Yes  |
| 059   | F      | 60  | MD11 | Yes    | Not reported                      | Yes  |
| 060   | F      | 35  | MD11 | Yes    | Bruised, sore legs                | Yes  |
| 061   | M      | 35  | MD11 | Yes    | Bruised & sore right leg          | Yes  |
| 062   | M      |     | MD11 | Yes    | Not reported                      | Yes  |
| 063   | M      | 54  | MD11 | Yes    | Unknown RMA*                      | No   |
| 064   | F      | 43  | MD11 | Yes    | Unknown RMA*                      | No   |
| 065   | F      | 43  | MD11 | Yes    | Unknown RMA*                      | No   |
| 066   | M      | 03  | MD11 | Yes    | Bleeding from mouth               | Yes  |
| 067   | F      | 21  | MD11 | Yes    | Leg & back                        | Yes  |
| 068   | M      | 50  | MD11 | Yes    | Right leg                         | Yes  |
| 069   | M      |     | MD11 | Yes    | Back                              | Yes  |
| 070   | F      | 21  | MD11 | Yes    | Leg & back                        | Yes  |
| 071   | M      |     | MD11 | Yes    | Not reported                      | Yes  |
| 072   | F      |     | MD11 | Yes    | Not reported                      | Yes  |
| 073   | F      | 21  | MD11 | Yes    | Leg & back                        | Yes  |
| 074   | M      |     | MD11 | Yes    | Back                              | Yes  |
| 075   | M      | 21  | MD11 | Yes    | Back RMA*                         | No   |
| 076   | M      |     | MD11 | Yes    | Back & shoulder                   | Yes  |
| 077   | M      | 60  | MD11 | Yes    | Back injury & shortness of breath | Yes  |
| 078   | F      | 60  | MD11 | Yes    | Not reported                      | Yes  |
| 079   | M      | 49  | MD11 | Yes    | Unknown RMA*                      | No   |
| 080   | M      | 48  | MD11 | Yes    | Unknown RMA*                      | No   |
| 081   | F      |     | MD11 | Yes    | Unknown RMA*                      | No   |
| 082   | M      | 37  | MD11 | Yes    | Unknown RMA*                      | No   |
| 083   | F      | 46  | MD11 | Yes    | Unknown RMA*                      | No   |
| 084   | M      | 39  | MD11 | Yes    | Unknown RMA*                      | No   |
| 085   | F      | 27  | MD11 | Yes    | Unknown RMA*                      | No   |
| 086   | F      | 34  | B727 | Yes    | Motion sickness                   | Yes  |
| 087   |        |     | B727 | Yes    | Unknown                           | Yes  |

| Ref # | Gender | Age | A/C  | Slides | Injury description and cause       | Hosp |
|-------|--------|-----|------|--------|------------------------------------|------|
| 088   | F      | 54  | DC9  | ?      | Sore right ankle                   | No   |
| 089   | F      | 40  | DC9  | ?      | Tailbone discomfort                | No   |
| 090   | F      | 10  | DC9  | ?      | Rug burn right thigh posterior     | No   |
| 091   | M      | 47  | B737 | No     | Laceration right knee              | No   |
| 092   | M      | 43  | B737 | No     | Abrasion left hand/twisted ankle   | No   |
| 093   | F      | 43  | B737 | No     | Cut on left hand                   | No   |
| 094   | M      |     | B737 | Yes    | Chest pains                        | Yes  |
| 095   | F      |     | B737 | Yes    | Sprained ankle                     | No   |
| 096   | F      |     | B737 | Yes    | Nervous                            | No   |
| 097   | F      |     | S340 | N/A    | Minor injury to right heel         | No   |
| 098   |        |     | DC9  | Yes    | Broken ankle                       | Yes  |
| 099   |        |     | DC9  | Yes    | Minor cuts & bruises               | No   |
| 100   |        |     | DC9  | Yes    | Sore knee                          | No   |
| 101   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 102   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 103   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 104   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 105   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 106   | M      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 107   | M      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 108   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 109   | M      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 110   | M      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 111   | M      | 29  | A300 | Yes    | Lower back pain                    | Yes  |
| 112   | F      | 33  | A300 | Yes    | Breathing problem                  | Yes  |
| 113   | F      | 40  | A300 | Yes    | Abdominal pain                     | Yes  |
| 114   | F      | 37  | A300 | Yes    | Lower back pain, breathing problem | Yes  |
| 115   | M      | 67  | A300 | Yes    | Chest & back pain                  | Yes  |
| 116   | M      | 50  | A300 | Yes    | Ankle (?fracture), lower back pain | Yes  |
| 117   | M      | 49  | A300 | Yes    | Back pain                          | Yes  |
| 118   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 119   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 120   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 121   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 122   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 123   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 124   | M      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 125   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 126   | M      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 127   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 128   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 129   | M      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 130   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 131   | F      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 132   | M      |     | A300 | Yes    | Unspecified injuries               | Yes  |
| 133   | F      | 53  | MD80 | Yes    | Pain lower left ribs               | Yes  |

| Ref # | Gender | Age | A/C  | Slides | Injury description and cause                     | Hosp |
|-------|--------|-----|------|--------|--|------|
| 134   | F      | 34  | MD80 | Yes    | Broken ankle & foot-Slip/fall wing foam          | Yes  |
| 135   | F      | 38  | MD80 | Yes    | Possible femur fracture                          | Yes  |
| 136   | M      | 31  | MD80 | Yes    | Abrasion left thigh/buttock-Slip/fall wing foam  | Yes  |
| 137   | F      | 36  | MD80 | Yes    | Pain back of neck/Slip/fall wing foam RMA*       | No   |
| 138   | F      | 51  | MD80 | Yes    | Pain left thigh-Slip/fall wing foam              | Yes  |
| 139   | M      |     | MD80 | Yes    | Pain & bump on left knee- RMA*                   | No   |
| 140   | M      | 36  | MD80 | Yes    | Pain right knee/Slip/fall wing foam RMA*         | No   |
| 141   | M      | 38  | MD80 | Yes    | Pain right knee & lower back-Slip/fall wing foam | Yes  |
| 142   | M      | 22  | MD80 | Yes    | Pain knees, low back & neck-Slip/fall wing foam  | Yes  |
| 143   | F      | 28  | MD80 | ?      | Left buttock pain                                | No   |
| 144   | F      |     | MD80 | ?      | Right knee injury                                | Yes  |
| 145   | M      | 63  | MD80 | ?      | Multiple contusions right leg                    | No   |
| 146   | F      |     | MD80 | ?      | Back spasm pain                                  | ?    |
| 147   | F      | 30  | MD80 | ?      | Right thigh abrasion                             | No   |
| 148   | M      |     | MD80 | ?      | Not reported                                     | ?    |
| 149   | F      | 18  | MD80 | ?      | Not reported                                     | ?    |
| 150   | M      |     | MD80 | ?      | Not reported                                     | ?    |
| 151   | F      |     | MD80 | ?      | Not reported                                     | Yes  |
| 152   | M      |     | MD80 | ?      | Head & neck injury                               | ?    |
| 153   | M      |     | MD80 | ?      | Not reported                                     | ?    |
| 154   | F      |     | MD80 | ?      | Not reported                                     | ?    |
| 155   | F      |     | MD80 | ?      | Muscle pain left leg                             | ?    |
| 156   | F      |     | MD80 | ?      | Bruises  | ?    |
| 157   | F      |     | MD80 | ?      | Chest pain                                       | ?    |
| 158   | F      |     | MD80 | ?      | Bruises  | ?    |
| 159   | M      |     | MD80 | ?      | Lower back pain                                  | ?    |
| 160   | F      |     | MD80 | ?      | Not reported                                     | ?    |
| 161   | M      | 27  | MD80 | ?      | Head & knee pain                                 | No   |
| 162   | F      | 29  | MD80 | ?      | Neck, knee & back                                | No   |
| 163   | M      | 34  | MD80 | ?      | Bruised/cut right knee                           | No   |
| 164   | M      |     | MD80 | ?      | Lower back, broken vertebrae                     | Yes  |
| 165   | M      |     | MD80 | ?      | Lower back pain , right thumb cut                | Yes  |
| 166   | M      |     | MD80 | ?      | Neck & head injuries                             | Yes  |
| 167   | M      |     | MD80 | ?      | Not reported                                     | Yes  |
| 168   | M      |     | MD80 | ?      | Shoulder & rib injury                            | Yes  |
| 169   | M      |     | MD80 | ?      | Neck injury/whiplash                             | Yes  |
| 170   | F      |     | MD80 | ?      | Back pain  | Yes  |
| 171   | M      |     | MD80 | ?      | Not reported                                     | ?    |
| 172   | M      |     | MD80 | ?      | Back pain  | ?    |
| 173   | M      |     | MD80 | ?      | Head & neck injury                               | ?    |
| 174   | M      |     | DC9  | Yes    | Minor lower back injury- RMA*                    | No   |
| 175   | M      | 73  | DC9  | Yes    | Injury to neck, back, shoulder                   | ?    |
| 176   | F      | 55  | DC9  | Yes    | Possible injury to left ankle                    | Yes  |
| 177   | M      | 34  | DC9  | Yes    | Abrasion to left elbow- RMA*                     | No   |
| 178   | F      | 54  | DC9  | Yes    | Abrasion to right elbow- RMA*                    | No   |
| 179   | M      | 82  | DC9  | Yes    | Bump on head/lower back pain                     | Yes  |

| Ref # | Gender | Age | A/C  | Slides | Injury description and cause                   | Hosp |
|-------|--------|-----|------|--------|--|------|
| 180   | F      | 48  | DC9  | Yes    | Lower back-Fell off wing                       | Yes  |
| 181   | F      | 52  | MD80 | ?      | Unknown- RMA*                                  | No   |
| 182   | F      | 76  | MD80 | ?      | High blood pressure- RMA*                      | No   |
| 183   | F      | 49  | MD80 | ?      | Injuries to neck, head, back                   | Yes  |
| 184   | F      |     | DC9  | Yes    | 2nd degree burn-puncture wound during evac     | Yes  |
| 185   |        |     | DC9  | Yes    | Ankle injury                                   | No   |
| 186   | M      |     | DC9  | Yes    | Back injury                                    | No   |
| 187   | F      |     | DC9  | Yes    | Self-reported smoke inhalation **              | No   |
| 188   |        |     | DC9  | Yes    | Laceration                                     | No   |
| 189   |        |     | DC9  | Yes    | Contusions                                     | No   |
| 190   |        |     | DC9  | Yes    | Lacerations, self-reported smoke inhalation ** | No   |
| 191   |        |     | DC9  | Yes    | Lacerations, self-reported smoke inhalation ** | No   |
| 192   |        |     | DC9  | Yes    | Lacerations, self-reported smoke inhalation ** | No   |
| 193   | F      |     | DC9  | Yes    | Lacerations, self-reported smoke inhalation ** | No   |

RMA\* = Refused Medical Assistance.

\*\* = No fire developed and these injuries were not confirmed by medical examination.

The 193 injuries were incurred during 19 PEEvacs. In two events (A/C AT72 and S340), evacuees were injured on airplanes not equipped with emergency escape slides.